

seven new species of fungi. This group is the least fully dealt with. Perhaps this is due to its comparative economic unimportance in the Faeröes, where the agriculture is in a very backward state. Thus the land, as is still the case in some parts of the west of Ireland, is too often allowed to seed itself after a barley crop.

F. Børgesen describes 323 species of fresh-water algæ, exclusive of diatoms, showing a comparatively rich flora. The fresh-water diatoms listed by E. Østrup number 269. This writer also reports on the marine diatoms, and sees in them no slight resemblance to the coastal diatoms of Greenland. The marine algæ are very thoroughly considered by F. Børgesen. His accompanying notes and figures are valuable, and his report deserves publication as a separate treatise for the sake of algologists. *Fucus serratus* and *Saccorhiza bulbosa* do not reach the Faeröes. *Halosphaera viridis* is plentiful. Several perforating algæ are recorded.

In the discussion of the origin of the Faeröese flora there is a healthy difference of opinion. Warming and others decide in favour of the view of its origin by the agency of wind, ocean currents, and migrating birds. Others, including Ostenfeld and Jensen, believe that the flora arrived along a post-Glacial land-bridge from Scotland. Sufficient has, we hope, been said to show that the Danish botanists have prepared a satisfactory account of the flora of the Faeröes, and, in addition, have made an important contribution to the study of phytogeography and plant ecology.

T. J.

#### SCIENCE TEACHING IN GERMAN SCHOOLS.

*Sammlung Naturwissenschaftlich-pädagogischer Abhandlungen.* Edited by Prof. O. Schmeil and Prof. W. B. Schmidt. Bd. ii. (Berlin: B. G. Teubner, 1908.) Price 12 marks.

THE volume contains eight essays dealing with various scientific subjects—chemistry, natural history, &c.—from the schoolmaster's point of view—that is to say, the writers are concerned with the organisation of the school curriculum and with the problem of how to make their respective subjects appeal to boys, or, perhaps, as a German would prefer to put it, how to make scientific instruction educative. Whilst the essays are entirely independent of each other, several of them are written from the Herbartian standpoint, which means that a writer on chemistry in the school is not satisfied with discussing the question of his immediate business—giving the boys an understanding knowledge of chemistry—he must also discuss the relation of the subject and the method of its presentation, to the formation of character, under which head much that the average Englishman would take for granted is somewhat sentimentally set forth.

The leading place in the volume is given to an article on the importance of experiment in the teaching of chemistry. We should not expect to find anything of the kind in an English book, for the simple reason that, both in theory and in practice, we have

long since abandoned the attempt to teach science in the schools without well-equipped laboratories and lecture-rooms. Rightly or wrongly, the German tax-master has not felt justified in calling upon the people to provide the costly apparatus necessary. Four years ago it was possible to find even a Berlin *Oberrealschule* almost destitute of all we regard as *sine quâ non* for the adequate teaching of science. Of course, the German will reply that it has not been a question of parsimony in education. What has been saved in the schools has been spent in the scientific equipment of the universities. The question of where the money may be most advantageously laid out is one which we have not, perhaps, considered very carefully, or, having considered it, those who decide these matters have come to a conclusion strikingly different from that of Prussia and other German States.

What is true of the higher schools of Germany is true also of the training colleges, in many of which there is no provision for practical work in science. The fact that the elementary-school teachers had no acquaintance with the handling of scientific apparatus led a recent advocate of chemistry in the primary school to make a rather quaint suggestion. Why should the teachers not avail themselves of the facilities afforded by the nearest chemist's shop? There they might learn the art of experimentation so far as it is necessary to the teaching of the elementary facts of the subject. It does not appear that the suggestion has found favour in the eyes of the teachers!

Some of the most interesting essays in the volume are concerned to change the character of school science from that of a mere accumulation of facts selected and systematised from a restricted standpoint to a form in which the work is directed to the realisation of a great general principle, or in which procedure is determined by the question of what general problems are accessible to the minds of the pupils at various stages in their intellectual development. Particularly interesting in this regard is the one entitled "Der dynamologische Lehrgang," in which the author sketches at considerable length a course of science for boys from eleven to fourteen. Nature is always a happening, a becoming, or a dissolving, and nature knowledge is really nothing else than clearness concerning processes—growing, breathing, blossoming, fading away. Indeed, every object in nature is a summation of processes, and only when we regard it in this way can there be a scientific study of nature.

In school, particularly, the science-teacher is to keep the unity of nature steadily before the children's minds, and he should frame his syllabus to bring out the connectedness of natural phenomena in a systematic way. The botanist does not usually regard a knowledge of the movements of the air as an essential preliminary to lessons on modes of fertilisation, nor would a teacher dealing with air-currents and their causes usually treat the subject from the point of view of a great source of energy which is essential to many natural processes. Each science as such takes its facts out of their natural surroundings and

puts them into a logical system more or less complete within itself, and the young student often completely misses the relation of that which occupies his mind to the universe as a whole. The author has worked out his idea in an ingenious and suggestive way.

It is impossible in a brief notice to deal adequately with the volume as a whole. In many points it shows that the writers are dealing with a condition of things that has really passed away in our country. For example, we should expect a sentence like this in an English book of a generation ago:—

“The reform we are advocating calls for nothing less than a fight à outrance against verbalism in every form. Such a battle could issue in nothing but good. Writers on the teaching of science have begun it already, but the old mistakes and prejudices are not easily overcome.”

Whilst there is not doubt that in the material equipment of our schools on the scientific side we are a long way ahead of the Germans, it still behoves us to remember that verbalism is not impossible side by side with lecture experiments and laboratory courses. It is the “carrying idea” that gives vitality to what the boys are doing—whether it be essay-writing or using a balance. There is still a good deal of misunderstanding in regard to this matter. Sensory accessories do not constitute the difference between the real and the verbal.

J. A. GREEN.

#### COUNTY GEOGRAPHIES.

*Cambridge County Geographies:—Essex.* Pp. viii+167. *Kent.* Pp. viii+146. *Surrey.* Pp. viii+151. *Sussex.* Pp. viii+144. By G. F. Bosworth. (Cambridge: University Press, 1909.) Price 1s. 6d. each.

THE idea of this series is excellent. A series of elementary geographies, each dealing with a single county, obviously ought to exist. The present volumes are all on one model, and the model is good. First a short survey of the origin of the county under notice, and of its name, is given. Its extent, relief, river-system, geology, natural history, and climate follow. Next the population and industries are dealt with; then the history of the county, its antiquities, its communications past and present, its administrative divisions ancient and modern, and the roll of famous men born within it. Finally there is an alphabetical gazetteer of the chief towns and villages (which, it may be added with regret, is the nearest approach to an index provided in the volumes). Following the text are certain diagrams showing density and other features of population, and agricultural conditions. At the beginning of each volume is a map (by Messrs. Philip) showing the relief of the land by the flat-colour contour system, and at the end another map, the same in outline, but coloured according to geological formations.

Here, then, is an excellent skeleton, and on the whole it is well clothed. Of details of the clothing,

however, some criticism may be offered. If we rightly apprehend the purpose of the series, the treatment of the relief of the land appears to have been given less prominence than is perhaps its due, while the geology—a subject which, in its strict sense, cannot appeal to a large circle of students—is given proportionately too much. In each volume the remarks introductory to some of the subjects differ hardly at all save in wording. This may have been inevitable, though it might have been thought sufficient to infer the reader's acquaintance with the generalities of each subject. At any rate, it is a matter for congratulation that in the introductory remarks on climate common to all the volumes, the faint praise of the Meteorological Office's weather forecasts, “which are often correct,” only occurs in one instance. Some of the sections deserve special commendation—the notices of the history of the counties and their architectural and other antiquities may be indicated.

The illustrations are partly from photographs and partly from line drawings. In each case the reproduction is well carried out. The architectural photographs are the best as a class. One would have welcomed a better attempt to illustrate characteristic land-forms, and in any case photography is a better medium for illustrating a work of this sort than line drawings, which in the present cases are not wholly successful. The maps are bound in on the excellent plan of attaching half of each one completely to the cover of the book—a good method of preserving them. Considered cartographically, while otherwise very fair, they have the somewhat serious fault of showing no physical features or geological formations beyond the confines of the county dealt with, so that they do not help in considering the county in relation to its surroundings, as the text very properly does.

But after these remarks it should be said that the series is well conceived, and so far well produced, and deserves success.

O. J. R. H.

#### SOLID AND PLANE GEOMETRY.

- (1) *Practical Solid Geometry.* By the Rev. P. W. Unwin. Pp. xii+267. (London: G. Bell and Sons, 1909.) Price 4s. 6d.
- (2) *Cassell's Elementary Geometry.* By W. A. Knight. Pp. vii+253. (London: Cassell and Co., Ltd., 1909.) Price 2s. 6d.

(1) THIS volume deals with the orthogonal projections of solids and of their plane sections, with explanations of figured plans and scales of slope of planes, followed by a chapter on metric or parallel pictorial projections, and one on miscellaneous problems.

It is an excellent book, well graduated, with clear though concise explanations of the numerous fully worked problems, and seems to be remarkably free from misprints for a first edition.<sup>1</sup> It should well fulfil the author's desire to make his readers “think in space.” This volume is arranged to cover Stage I

<sup>1</sup> We have found only one, viz. on p. 102, l. 4, where H.P. should be V.P.